

A poorly known taxon: *Diplorhoptrum orbulum* (Emery 1875) *

BRUNO POLDI

Viale Leopardi 2, 46100 Mantova, Italy

Received 9 January 1992

Preliminary information is given about the nuptial flight, nest foundation, breeding in artificial nests. In addition, the systematic position of the taxon is discussed.

KEY WORDS: Hymenoptera, Formicidae, Solenopsidini, *Diplorhoptrum orbulum*, nest foundation.

INTRODUCTION

Reports on *Diplorhoptrum orbulum* (Emery 1875) are considerably scarce in ant literature (BARONI URBANI 1971). They concern the presence of *D. orbulum* on the islands in the North and Central Tyrrhenian sea, on the Maltese islands (BARONI URBANI 1968a, SCHEMBRI & COLLINGWOOD 1981), in the Iberian peninsula (COLLINGWOOD 1976) down to Andalucia (ORTIZ & TINAULT 1987). KUGLER (1988) reports *D. orbulum* from Egypt and Turkey.

During 4 years research on the ant fauna of the Maremma Natural Park (Grosseto, Italy) it was possible to collect some tens of the females, some hundreds of the males and 28 workers which can be probably assigned to this taxon. The observations made on some colonies reared in captivity are of some interest, owing to the rarity of this species.

TAXONOMIC POSITION AND ECOLOGY

Among the tribe Solenopsidini two genera are clearly separable, *Monomorium* and *Solenopsis*, the latter including (CREIGHTON 1950, GREGG 1963) the subgenus *Diplorhoptrum*, later synonymized by ETTERSCHANK (1966). BARONI URBANI (1968b)

* Paper presented at the "IV Convegno della Sezione Italiana dell'International Union for the Study of Social Insects (I.U.S.S.I.)" - Associazione Italiana per lo Studio degli Artropodi Sociali e Presociali (A.I.S.A.S.P.), Firenze, Italy, 14-15 December 1990.

on the basis of male genitalia, emended the name *Diplorhoptrum* as a good genus (subgenus in WILSON 1986).

This position (shared with PAGLIANO & SCARAMOZZINO 1990) is followed in the present article, although BOLTON (1987) considers the characters "far lower than those utilized to discriminate genera". In addition, the genus includes at least two large groups: the *fugax* group, and the *orbulum* group.

Bibliographical entries concerning the western and middle Asian palaearctic area mention no less than 25 taxa belonging to the *orbulum* group (13 in Algeria and Tunisia). Several taxa are based on isolated females (SANTSCHI 1934).

The nuptial flight. Unlike *Diplorhoptrum* of the *fugax* group which flies in the early afternoon in September-October (STITZ 1939) *D. orbulum* makes its nuptial flight (in the area of the Uccellina hills), at the beginning of the last 10 days of July (especially on 22nd and 23rd: winged individuals can be found from 19th) in nice weather and also in a light breeze (personal observations in the years 1988-1989-1990). The sexuals leave their nests early in the morning (presumably around 6:30-7:00 local time) as the winged fly down to the ground between 7:00 and 9:00 (local time). SCHEMBRI & COLLINGWOOD (1981) too, described the flight in the early morning at a height of 1 to 1.50 m above the ground, but oddly enough, they do not include findings of winged individuals in their list of captures. Unlike the findings for taxa of the *fugax* group, no swarm has been seen by the author, even though a search was made around the capture site within a 50 m range. With reference to "macrohabitat selection" (KANNOWSKI 1959) it seems clear that very damp areas are the favourite ones: almost all the females and males collected were floating on the surface of the water in a swimming pool. The biggest collection was made on July 22nd 1990: 14 females and 267 males were found between 7:00 and 8:25 a.m. (local time). Research in the area lasted from 5:50 to 9:00 a.m. (local time). Therefore the flight can be reckoned to be between "sparse flight" and "moderate flight" (KANNOWSKI 1959) which might indicate that the population of the starting nest amounts to at least 3000 workers (KANNOWSKI 1959).

The males were at once put in a 70% alcohol solution; the females were placed in small cells in plaster nests (Janet system) (POLDI 1963). These nests were kept at high humidity, near the saturation point (in Chauvin type glass nests, the females settled down on the water-soaked cotton cap). About 80% of the females died in the days following their settling down in the cells, probably due to chlorine in the water.

It was also observed that the few females collected on the swimming pool side (wet with tap-water) immediately took off their wings.

Nest foundation. Some days after being put in the small cell, the female is able to complete her reclusion by filling tiny plaster particles into the gaps between the walls and the glass cover (a behaviour which can be considered equivalent to the closing of the access tunnel to the cell dug in the ground). Then egg-laying is started. The "obstetrical position" is unusual. The females seems to be sitting on her own gaster which lies with all its dorsal part on the substrate. In 3 days seven to 20 eggs are laid: many of which can be considered as food. Their average size is about 0.320×0.290 mm; smaller ones about 0.220×0.200 mm.

As it was the hot season, after 6-7 days the first larva appeared; then others followed up to a maximum of 7-8. After about 2 weeks, the first pupa appeared in 21-22 days it developed into the first worker. Before the end of September several workers (usually 3 to 6) eclosed. At this stage, besides the workers, 3 to 8 larvae and

some eggs are found (the population of the nest sacrificed on 5 October 1990 was composed as follows: 1 female without wings, 3 workers, 1 white pupa, 9 larvae (1 of which was newly born) 4 eggs (1 of which was markedly smaller). It is interesting to note that — in this taxon too, with relatively big-gastered females — signs of pupiphagy (or eopupiphagy) are shown (as it has already been described for *Tetramorium*, POLDI 1963 and *Leptothorax*, POLDI 1989).

Feeding. Experimental placements of colonies of *Crematogaster sordidula* Nyl. and *Lasius alienus* (Foerst.) in cells near the nest of *D. orbulum* did not elicit lesto-biotic behaviour by the latter species, although one could according to FOREL (1869) it could have been surmised. Rather workers and females fed on honey, dead *Drosophila* and boiled egg yolk. At the beginning of the second winter, the nests contained over 40 workers and many larvae.

Monogyny. Regular foundation took place in two nests — out of the five founded — by two pairs of females kept together (and after a year's communal life there was still harmony between them). Yet, the doubt remains that only one female in each nest was fecund: the populations in the two nests were not higher than those in the nests founded in monogyny that were equally cared for (at present, it is also impossible to exclude functional monogyny). Other attempts to keep three females together have been completely unsuccessful; all of them died in a short time although no sign of mutilation was found.

Habitat. Twenty-eight workers have been collected by means of a trap (containing a mixture of honey and beer). The trap was laid in a wide dip between two hills, close to the foot of a thickly-grown bush of *Rosmarinus officinalis* L., and with dry moss on the ground. Vegetation in evolution of the gariga type (with *Arbutus unedo* L., *Spartium junceum* L.) was growing on a limy substratum. Together with *D. orbulum* there were 174 workers of *Aphaenogaster spinosa nitida* Em.

ACKNOWLEDGEMENTS

The author is very grateful to Prof. C. Baroni Urbani, Basel, for his most valuable advice, to Dr I. Boschi, Director of the Parco Naturale della Maremma (Tuscany) for making the research possible and easy. Many thanks are also due to the Head Office of the Talamone Camp-site for collaboration.

REFERENCES

- BARONI URBANI C. 1968a. Studi sulla mirmecofauna d'Italia. IV. La fauna mirmecologica delle Isole Maltesi ed il suo significato ecologico e biogeografico. *Annali del Museo Civico di Storia Naturale di Genova* 77: 408-559.
- BARONI URBANI C. 1968b. Über die eigenartige Morphologie der männlichen Genitalien des Genus *Diplorhoptrum* Mayr (Hym. Formicidae) und die Taxonomischen Schlussfolgerungen. *Zeitschrift für Morphologie und Ökologie der Tiere* 63: 63-74.
- BARONI URBANI C. 1971. Studien zur Ameisenfauna Italiens. XI. Die Ameisen der Toskanisches Archipels. Betrachtungen zur Herkunft der Inselfaunen. *Revue Suisse de Zoologie* 78 (4): 1037-1067.
- BOLTON B. 1987. Revue of the *Solenopsis* genus-group and a revision of Afrotropical

- Monomorium* Mayr (Hym. Formicidae). *Bulletin of the British Museum (Natural History) (B, Entomology)* 54: 263-452.
- COLLINGWOOD C.A. 1976. A provisional list of Iberian Formicidae with a key to the worker caste. *Eos* 51: 65-95.
- CREIGHTON W.S. 1950. The ants of North America. *Bulletin of the Museum of Comparative Zoology at Harvard College Cambridge, Mass.* 104: 1-585, 57 pls.
- ETTERSCHANK G. 1976. A generic revision of the Word Myrmecinae related to *Solenopsis* and *Pheidologeton* (Hymenoptera Formicidae). *Australian Journal of Zoology* 14: 73-171.
- FOREL A. 1869. Observations sur les mœurs du *Solenopsis fugax*. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 3: 105-128.
- GREGG R.E. 1963. The ants of Colorado. *Boulder, Colorado: University of Colorado Press*, 792 pp.
- KANNOWSKI P. 1959. The flight activities and colony founding behaviour of Bog Ants in southeastern Michigan. *Insectes Sociaux* 6 (2): 115-162.
- KUGLER J. 1988. The zoogeography of social insects of Israel and Sinai, pp. 251-276. In: Yom-Tov Y. & Tchernov E., Edits. The zoogeography of Israel. *Dordrecht: Dr Junk Publishers*.
- ORTIZ F.J. & TINAUT J.A. 1987. Citas nuevas o interesantes de Formicidos (Hym. Formicidae) para Andalucía. *Boletín de la Asociación Española de Entomología* 11: 31-34.
- PAGLIANO G. & SCARAMOZZINO P. 1990. Elenco dei generi di Hymenoptera del mondo. *Memorie della Società Entomologica Italiana* 68 (1989): 1-210.
- POLDI B. 1963. Studi sulla fondazione dei nidi nei Formicidi. I, *Tetramorium caespitum* L. *Atti IV Congresso UIEIS, Pavia, Symposia Genetica et Biologica Italica* 12: 132-199.
- POLDI B. 1989. La fondation du nid chez *Leptothorax angustulus* Nyl. (Hym. Formicidae). *Actes des Colloques des Insectes Sociaux* 5: 75-82.
- SCHEMBRI S.P. & COLLINGWOOD C.A. 1981. A revision of the myrmecofauna of the Maltese Islands (Hym. Formicidae). *Annali del Museo Civico di Storia Naturale di Genova* 83: 417-442.
- SANTSCHI F. 1934. Contributions aux *Solenopsis* palearctiques. *Revue Suisse de Zoologie* 41 (36): 565-592.
- STITZ H. 1939. Hautfluger oder Hymenoptera. I: Ameisen oder Formicidae. *Die Tierwelt Deutschlands* 37: 1-428.
- WILSON E.O. 1986. The defining traits of fire ants and leaf-cutting ants, pp. 1-9. In: Lofgren C.I.S. & Vander Meer R.K., Edits. Fire ants and leaf-cutting ants. *Boulder, Colorado: Westview Press*, 435 pp.